R·I·T

Title: Trion Minilock RIE

Semiconductor & Microsystems
Fabrication Laboratory **Revision**: **C** **Rev Date: 11/08/11**

Approved by:

_____ / / _____ / /
Process Engineer Equipment Engineer

1 SCOPE

The purpose of this document is to detail the use of the Trion RIE. All users are expected to have read and understood this document. It is not a substitute for in-person training on the system and is not sufficient to qualify a user on the system. Failure to follow guidelines in this document may result in loss of privileges.

2 REFERENCE DOCUMENTS

- Material Safety Data Sheet for Argon, Oxygen, CHF3, and CF4
- Phantom RIE Users Manual

3 DEFINITIONS

n/a

4 TOOLS AND MATERIALS

4.1 General Description – The Trion Minilock RIE is capable of etching both 4 and 6 inch wafers. It currently has Argon, Oxygen, CF4, and CHF3 available and is intended for etching oxide.

5 SAFETY PRECAUTIONS

5.1 Personal Safety Hazards

5.1.1 **High Voltage and Radio Frequency Hazard** - Never operate the tool without the covers in place.

5.1.2 **Pinch hazards** – Use caution when closing lid and never operate the robot with the lid open.

5.2 Hazards to the Tool

5.2.1 **Irregular substrates** – Please consult a staff member before processing any substrate that is not either a 4 or 6 inch wafer.

5.2.2 **Contamination** – Wafers with gold, copper or similar metals are not allowed. Aluminum and refractory metals are ok. Also make sure the backs are reasonably clean.

5.2.3 **Excessive power** – Power should be limited to 300 watts due to excessive heating.

6 INSTRUCTIONS

6.1 Initial State Check

6.1.1 Service Chase Setup

6.1.1.1 In the chase behind the Trion ensure the chiller is on.

6.1.1.2 On the Nitrogen Manifold-2725, verify that the nitrogen is on for the Trion Minilock.

6.1.2 Move the track ball to wake the computer monitor.

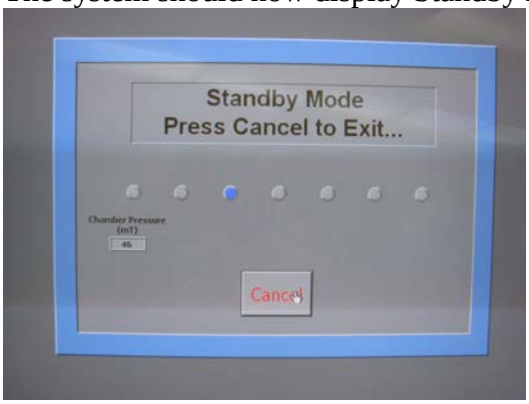
6.1.3 Ensure RF Unit is powered on. AC Line On light is illuminated (Panel #15)

6.1.4 Ensure RF Match Network is powered on. AC On light is illuminated (Panel #14)

6.1.5 Ensure Turbo Controller is on and operational. Green light in lower right corner is on. (Should display 709-710 Hz)

6.2 Starting from Standby

6.2.1 The system should now display Standby Mode



6.2.2 Left click <**Cancel**>

6.2.3 This will vent the Load Lock allowing wafers to be loaded.

6.2.4 If there are any problems check with a staff member.

6.3 Loading a Wafer

6.3.1 Lift door on load lock chamber (Top left side of tool)

6.3.2 Place wafer on load arm:

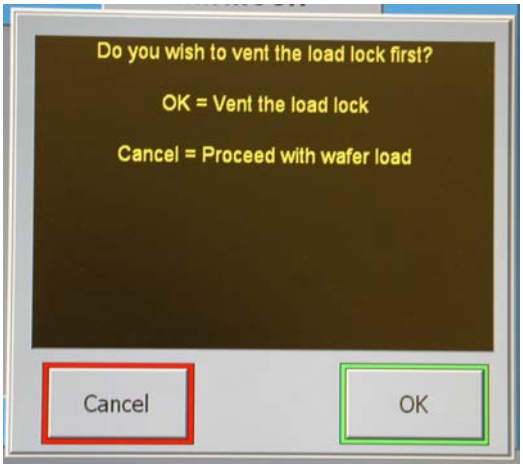
6” wafer against three pins

4” wafer against lower part of wafer arm

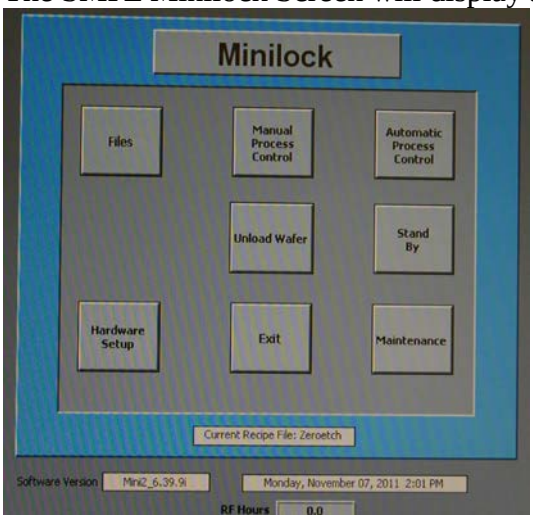
6.3.3 Place flat of wafer towards front of tool

6.3.4 Close lid and left click on <**Load Wafer**>

6.3.5 Left click **<Cancel>**

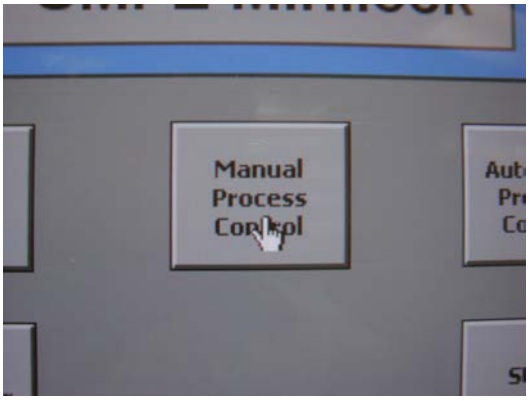


6.3.6 The SMFL Minilock Screen will display after the wafer is loaded.



6.4 Manual Operation Mode

6.4.1 Left Click <**Manual Process Control**>



6.4.2 Manual Process Control Panel is now displayed

6.4.3 In this screen everything in the solid grey boxes is adjustable.

6.4.5 Place the cursor over any of the solid grey boxes and left click.

6.4.6 A screen will come up with numbers.

Enter desired parameters and left click <**ENTER**>

6.4.7 Repeat above step for all parameter changes

6.4.8 When program is adjusted to desired range left click <**Gas OFF**>
This turns the gas on

6.4.9 Let gasses stabilize then left click <**RF OFF**>
This turns the RF on.

6.4.9 Forward and Reverse power can be read on the display on the front of the RF power supply by toggling center switch.. (Panel #15)

6.4.10 Timer will now count up from zero. During this etch you are able to left click on the grey boxes and make adjustments while the tool is running.

6.4.11 Process time set doesn't stop the process once time is reached. **<RF ON>** then **<GAS ON>** stops the process

6.4.12 Pressure Set will "bounce" while process is running. This is normal and will not affect your process.

6.4.13 To stop program left click on <**RF ON**> (turns the RF off)

6.4.14 Left click <**Gas On**>. (turns the gasses off)

6.4.15 Write down parameters before exiting screen.

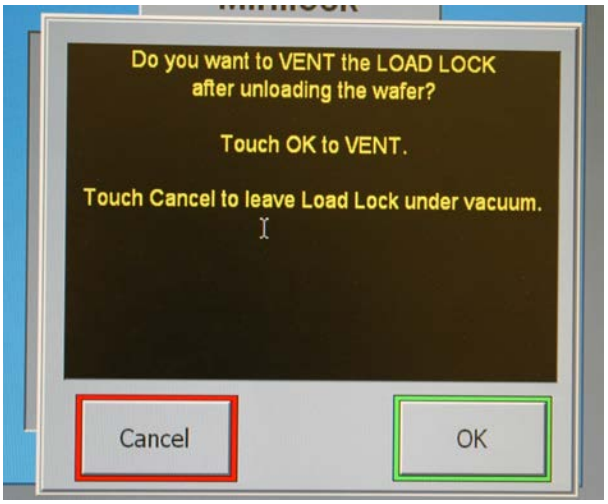
6.4.16 Left click **<EXIT>** once you have recorded your settings.
Proceed to 6.6 to unload if needed.

6.5 Automatic Process Control

6.5.1 This process will run a pre-loaded program once the button is selected.
6.5.2 Left Click <**FILES**>
6.5.3 Left click on the desired program
6.5.4 Left click <**EXIT**>
6.5.5 To ensure the correct program has been selected and loaded or to make an adjustments of the selected program prior to running left click <**Manual Process Control**>
6.5.6 Adjust parameters as needed by left clicking on the appropriate solid grey box and entering the wanted information. Left click <**Enter**> when done.
6.5.7 Repeat for all needed adjustments
6.5.8 When all corrections are complete left click <**Exit**>
6.5.9 Left click <**Automatic Process Control**>
6.5.10 Program begins the moment Automatic Process Control is selected.
6.5.11 When program ends a verification screen displays. Left click <**OK**>

6.6 Unloading Wafers

6.6.1 Left click **<Unload Wafer**>
6.6.2 Left click **<OK>**



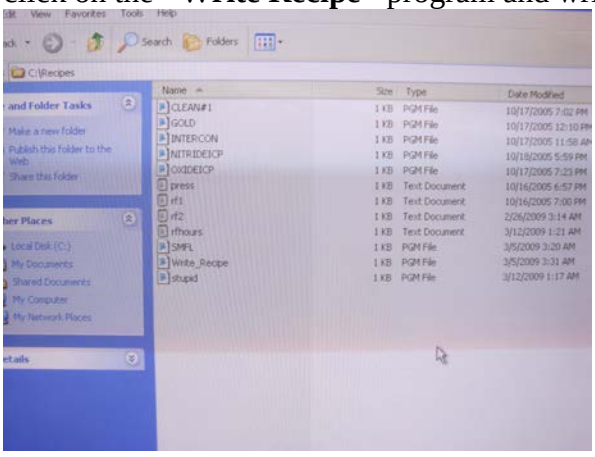
6.6.3 When wafer is in the Load Lock the door will vent.
6.6.4 Lift the lid and unload the wafer. Use tweezers, not your fingers.
6.6.5 Left click **<Cancel>** at "Do you wish to pump down load lock" screen.
6.6.6 If another wafer is to be processed refer to section **6.3**

6.7 Writing a Recipe

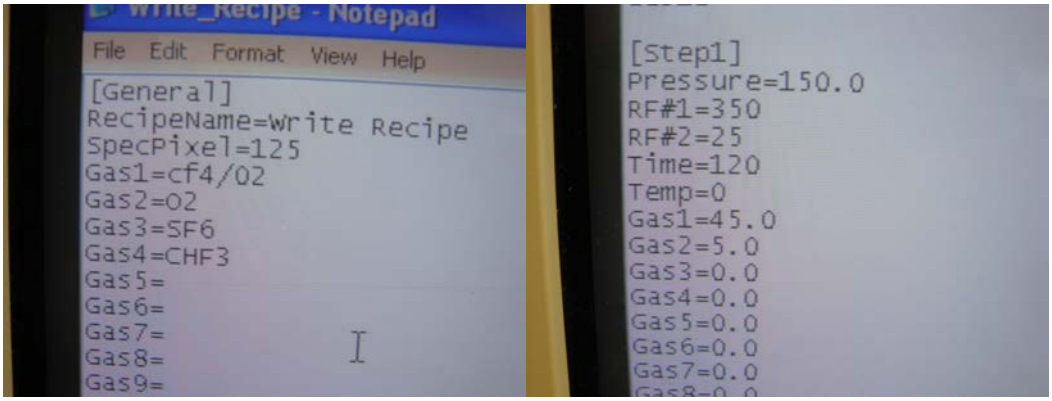
6.7.1 To write a Recipe and save it to the hard drive press <**ALT**> and <**TAB**> at the same time.

6.7.2 This will allow you to switch from the Trion program to the Recipes screen.

6.7.3 Double click on the recipe that you would like to adjust and then save or double click on the <**Write Recipe**> program and write your own.



6.7.4 The parameters that you may change include the RecipeName, the Pressure, the RF#2, the Time, Gas1, Gas2, Gas3, and Gas4 settings. The other parameters listed are not active on our machine.

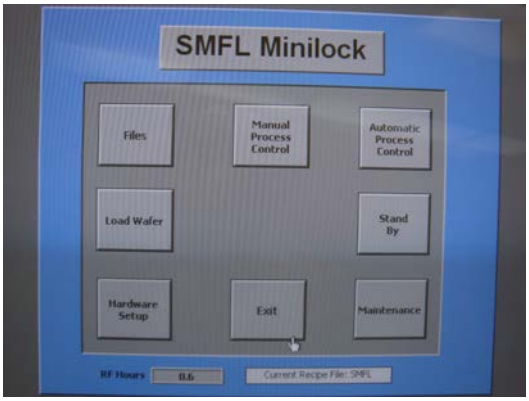


6.7.5 Additional steps may be added if needed following the same format.

6.7.6 Go to **<FILE>** and got to **<SAVE AS>**. The filename is the recipe name followed by .pgm. For example **Nitride.pgm**.
You may name it whatever will assist you to find it again. Nothing vulgar is allowed.

6.7.7 Close the Notepad page only. Do not close the recipe screen. Press <**ALT**><**TAB**> to get back into the Trion Program.

6.7.8 At this time you may follow section **6.4 Manual Process Control** or section **6.5 Automatic Process Control**. Select the appropriate section for your process.



6.8 Standby

6.8.1 When you are finished with the tool and all wafers are removed left click <**Stand By**>

6.8.2 Unit will pump down load lock and go into the Stand By screen.

6.8.3 The tool is now in Stand By

6.9 Errors of the tool

6.9.1 If the recipe screen is accidentally closed press the Windows Key and <**D**>. This will allow the Desktop to display.
6.9.2 Double click on the file folder <**Recipes**>
6.9.3 If recipe screen is needed refer to 6.7 otherwise follow directions starting at 6.7.7
6.9.4 If the Trion Program is accidentally closed (By left clicking on <**EXIT**> from the SMFL Minilock screen double click on the <**Trion.pgm**> file on the desktop. This will restart the Trion Program.
6.8.5 If the Trion program does not restart correctly please get a technician.

7 APPROPRIATE USES OF THE TOOL

7.1 The Trion etcher is intended for etching of oxide.
7.2 The Trion etcher is a semiclean tool and wafers with gold or copper should not be processed.

8 ATTACHMENTS

REVISION RECORD

Summary of Changes	Originator	Rev/Date
Original Issue	Sean O'Brien	A-10/12/06
2nd Edition	Richard L Battaglia	B-04/27/09
3rd Edition	Richard L Battaglia	C-11/08/11